Red Hill, New Mexico monogenetic volcanic field: Variations in vent morphology
René A. De Hon and Ryan Travis

Summary
Located in Catron County on the western border of New Mexico, the Red Hill volcanic field lies on the western edge of the state along the Jemez structural alignment. Quaternary and Tertiary lava flows rest on Cretaceous strata. Quaternary faulting produces N 28° W trending scarps and provided pathways for ascending gases and magmas. Quaternary volcanism produced a mix of landforms including maars, cinder cones, cinder mounds, and basalt flows interspersed between older basalt-capped mesas. Twenty-two vents are identified as cinder cones or cinder mounds. Fifteen are identified as maars or alterations of maars which range from nearly 2.0-0.50 km in diameter. Most maar craters are surrounded by raised rims composed of loosely consolidated, volcanioclastic materials (base surge and airfall). Some maars contain inter-crate cinder cones or cinder mounds.

Cinder Cones
Cinder cone built of tan-brown alkaline basaltic lipari tuff have basal diameters range from 100 m to 1 km. Cone heights range 700 - 1000 m. Maximum outer slopes are 35°. Breached cones are identified with lava flows. Flows average 20 m thick, but some reach 30 m.

Red Hill, Pasto, and Compuesto Maars
Red Hill maars are part of a sub-alkaline basalt lava field.

Lava Flows
Young Quaternary basaltic lava flows and flows interspersed between older basalt-capped mesas. Eruptions in a topographic line extending north produced a thick lava flow (65-100 m) that mostly buried its source vent.

Location
The Red Hill volcanic field is located on the extreme western edge of New Mexico along the Jemez structural trend that includes Mt. Taylor, Valles Grande, and the Raton volcanic field. Locally, the Red Hill field is located between the Jemez volcanic field to the west in Arizona and the Bandera volcanic field to the southeast.

Cinder Mounds
Cinder mounds are volcano cones without apical craters. Mounds are generally smaller than the better-developed cinder cones. Basal diameters range from 100 m to 1 km, and mound heights range up to 200 m. Small mounds are shown in rear view illustration.

Small Vents
Small venting activity is found within the field.

Small Cinder Mounds
Small cinder mounds occur as individual vents and on the interioralf some of the maars. Basal diameters are in the order of a hundred meters and elevations are 10-50 m. At the Compuesto maar the internal cone grew to completely fill the crater.

Small Cinder Mounds
Small cinder mounds are found in a wide range of morphologies depending on eruptive activity and volumes of materials. Maar and smaller pit craters are formed by gas-charged eruptions as magma encounters ground water. Cinder cones and mounds build constructional cones with slopes at the angle of repose.

Maar Depth vs. Diameter
Maars range in depth from 20 to 100 m and are less than 1 km in diameter.

Variations
Volcanic vents are found in a wide range of morphologies depending on eruptive activity and volumes of materials. Maar and smaller pit craters are formed by gas-charged eruptions as magma encounters ground water. Cinder cones and mounds build constructional cones with slopes at the angle of repose.

Selected References
